DETAILED ACTION

Amendment

1. Acknowledgement is made of Amendment filed December 7, 2007.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 8-21, and 23-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sadarangani et al. (PCT Document No.: WO 01/78219), and further in view of Kaneda et al. (US Patent Application Pub. No.: US 2002/0180295 A1).

For claim 1, Sadarangani et al. teach an electrical machine comprising a stator comprising a plurality of stator elements (see figure 3) with magnetic flux conductors (reference numeral 3') and an electric conductor forming a winding (reference numeral 6a) extending in a winding path through each magnetic flux conductor, and a movable element (reference numeral 10) which comprises a number of permanent-magnet members (reference numeral 12') and which is movable in relation to the stator along a movement path, wherein the movable element is adapted to carry out a reciprocating motion (see page 18, lines 11-14), wherein the winding path comprises a first current-carrying section (reference numeral 6a) extending along the movement path, wherein each magnetic flux conductor is adapted to form, together with one of said permanent-

magnet members, a closed magnetic flux circuit extending around said current-carrying section (see figure 3), wherein each permanent-magnet member comprises a primary magnet that has a north pole and a south pole and a magnetic direction extending from the south pole to the north pole and essentially across the movement path (see figure 3), and wherein the permanent-magnet members are arranged in an alternating order in the movable element with respect to the magnetic direction of the primary magnet (see figure 3), characterized in that adjacent permanent-magnet members of the movable element are separated from each other by an intermediate member (reference numeral 13). Sadarangani et al. do not teach the intermediate member having at least one secondary magnet having a magnetic direction going across the magnetic direction of the primary magnet.

Kaneda et al. teach a rotor (see figure 7B), i.e. movable element, having magnet blocks which can constitute the primary magnet (whose arrows point toward/away from the center of rotation) and the secondary magnet of the intermediate member (arrows pointing along the circumferential direction).

It would have been obvious to have this configuration for the secondary magnets of the intermediate member, since the invention of Kaneda et al. is an electrical machine with permanent magnets, the same technological field as the claimed invention, and a person of ordinary skill would be able to apply this technique in the invention of Sadarangani et al. for the purpose of reducing the magnetic flux leakage between adjacent permanent magnets.

For claim 2, Kaneda et al. illustrate the magnetic direction of the secondary magnet going across the magnetic direction of the primary magnet (see figure 7B), and the magnetic direction of the secondary magnet would extend parallel to the movement path of the movable element when in combination with the invention of Sadarangani et al. This configuration would have been obvious for the same reasons given above for claim 1.

For claim 8, Kaneda et al. illustrate the magnetic direction of the secondary magnet being perpendicular to the magnetic direction of the primary magnet (see figure 7B). This configuration for the magnetic direction would have been obvious for the reasons given above for claim 1.

For claim 9, Sadarangani et al. disclose the magnetic flux circuit having a magnetic flux that is parallel to a plane perpendicular to the movement path (see page 18, claim 2).

For claim 10, Sadarangani et al. disclose the distance between the centre of adjacent permanent magnet members being essentially equal to the distance between the centre of adjacent magnetic flux conductors of the stator (see page 18, claim 3).

For claim 11, Sadarangani et al. disclose the magnetic flux conductors of the stator being arranged in an alternating order with respect to the direction of the magnetic flux in relation to the permanent magnet members in the respective magnetic flux circuit (see page 18, lines 22-25).

For claim 12, Sadarangani et al. disclose the essentially closed winding path having a second current carrying section extending parallel to the movement path (see page 19, lines 35+).

For claim 13, Sadarangani et al. disclose the first current carrying section of the winding path being associated with the first half of the magnetic flux conductors of the stator and the second current-carrying section of the winding path being associated with the second half of the magnetic flux conductors of the stator (page 20, lines 8-14).

For claim 14, Sadarangani et al. disclose the permanent magnet members of the movable element being adapted to cooperate with the magnetic flux conductors of the stator which are associated with the first current carrying section, and the magnetic flux conductors of the stator which are associated with the second current carrying section (page 20, lines 16-24).

For claim 15, the invention of Sadarangani et al. anticipates the magnetic flux conducting sections of each magnetic flux conductor being arranged in a line one after the other which is parallel to the movement path, and the magnetic flux in each conductor being extended in the same direction, since this constitutes the magnetic flux conductors being arranged in such a manner that the direction of the magnetic flux in relation to the winding is the same in each magnetic circuit as disclosed in Sadarangani et al. (see page 19, lines 8-12). Sadarangani et al. also disclose the adjacent magnetic flux conductors being separated by an intermediate element (see page 21, lines 4-8), i.e. dividing member, but does not disclose the dividing member being made of magnetically conducting material. It would have been obvious to have this sort of

material, since a person of ordinary skill in the art would have been able to select this known material for its suitability in the invention.

For claims 16 and 17, since Sadarangani et al. anticipate the magnetic flux conducting sections as explained for claim 15, it would have been obvious to have these sections form a central section and end sections as recited in claims 16 and 17 since this would involve a rearrangement of parts which has been held to be a routine skill in the art. *In re Japikse*, 86 USPQ 70.

For claim 18, Sadarangani et al. disclose the intermediate element (i.e. dividing member) being magnetically isolating (see page 21, lines 7-8), i.e. magnetically insulating.

For claim 19, it would have been obvious to have the dividing member form a space with air along the end sections, since this would involve a change in the shape of a component, and this particular configuration is just one of numerous configurations a person of ordinary skill in the art would find obvious for the purpose of providing magnetic insulation. *In re Dailey* 149 USPQ 47, 50 (CCPA 1966). See also Glue Co. v. Upton 97 US 3,24 (USSC 1878).

For claim 20, it would have been obvious to have the dividing member be made of a magnetically conducting iron, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

For claim 21, since Sadarangani et al. anticipate the magnetic flux conducting section being arranged in a line one after the other parallel to the movement path as

explained for claim 15, this configuration would make the plane of these sections be disposed perpendicularly to the movement path.

For claim 23, Sadarangani et al. disclose the movable element connected to one piston that is movably arranged in a housing (see page 19, lines 25-27).

For claim 24, the housing of Sadarangani et al. (reference numerals 22, 23) can be used as a combustion chamber where the piston (reference numerals 20, 21) can move back and forth, and it would have been within the knowledge of a person skilled in the art to enable the electrical machine disclosed by the references of Sadarangani et al. and Kaneda et al. to cooperate with any type of engine, i.e. a combustion engine.

For claim 25, Sadarangani et al. disclose that the movement path can be curved (see page 17, lines 11-13), i.e. the movable element can carry out a rotating movement.

For claims 26 and 27, since the structural limitations of the electrical machine are disclosed by the inventions of Sadarangani et al. and Kaneda et al. as explained for claim 1, this would enable the machine to be used as a generator for generating electric power, including generators that are adapted to constitute a component in a wind power plant or a wave power plant.

For claims 28 and 29, since the structural limitations of the electrical machine are disclosed by the inventions of Sadarangani et al. and Kaneda et al. as explained for claim 1, this would enable the machine to be used as a motor for generating mechanical power, including motors that are adapted to form a drive motor in a vehicle.

4. Claims 3, 4, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sadarangani et al. and Kaneda et al. as applied to claims 1 and 2 above, and further in view of Richter (US Patent No.: 4308479).

For claim 3, the references of Sadarangani et al. and Kaneda et al. teach the claimed invention except for the intermediate member having two secondary magnets. It would have been obvious to have this type of configuration, since Richter provides a technique of providing magnets (reference numerals 62, 63, see figure 3) in between magnets referenced by numerals 47 and 48 for the purpose of reducing flux leakage (see column 1, lines 45-62), and a person of ordinary skill in the art can rearrange the magnets so that two magnets can be placed in between the primary magnets and apply it to the inventions of Sadarangani et al. and Kaneda et al., since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.

For claims 4, 6, and 7, it would have been obvious to have the secondary magnets arranged so that the first secondary magnet is in the vicinity of the north pole of the primary magnet of the first permanent-magnet member and the south pole of the primary magnet of the second permanent-magnet member and so that the second secondary magnet is in the vicinity of the south pole of the primary magnet of the first permanent-magnet member and the north pole of the primary magnet of the second permanent-magnet member (claim 4), and also to have magnetic flux conductors on each sides of the primary magnet (claim 6) and have the first secondary magnet extend between the first magnetic flux conductor of the two permanent-magnet members and

the second secondary magnet extends between the second magnetic flux conductor of the two permanent-magnet members (claim 7), since these configurations would have involved rearranging the magnets and the magnetic flux conductors (reference numerals 50, 52) illustrated in figure 3 of Richter, and rearranging parts of an invention involves routine skill in the art as explained for claim 3 above.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sadarangani et al., Kaneda et al., and Richter as applied to claim 3 above, and further in view of Nashiki (US Patent No.: 6211593).

For claim 5, the references of Sadarangani et al., Kaneda et al., and Richter teach the claimed invention except for the intermediate member having a layer of magnetically insulating material on the secondary magnets. It would have been obvious to have this configuration, since Nashiki uses a similar technique of using magnetic insulating members on the magnetic poles (see column 4, lines 50-65), and a person of ordinary skill can apply this magnetic insulator onto the secondary magnets of the intermediate member for the purpose of preventing demagnetization of the secondary magnets.

Response to Arguments

6. Applicant's arguments filed December 7, 2007 have been fully considered but they are not persuasive. With respect to the argument that the magnets disclosed in Kaneda et al. do not correspond to the secondary magnets of claim 1, the examiner

respectfully submits that the rotary machine disclosed in Kaneda et al., figure 7B, can be modified by a person of ordinary skill by splitting the circumferential configuration so that the magnets are lined up in a linear fashion. The examiner also requests applicant to consider the reference of Chitayat (US Patent No.: 5723917), in which a similar configuration has been disclosed for the magnetic direction for the magnets of a motor (see figure 9), and a person of ordinary skill would have been able to include this for the purpose of reducing the magnetic flux leakage between adjacent permanent magnets.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEX W. MOK whose telephone number is (571)272-9084. The examiner can normally be reached on 7:30-5:00 Eastern Time, 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quyen P. Leung can be reached on (571) 272-8188. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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